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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,585	10/23/2003	Jon Krueger	P17966	9483
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CAVEN & AGHEVLI c/o INTELLEVATE P.O. BOX 52050 MINNEAPOLIS, MN 55402			EXAMINER BAKER, STEPHEN M	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/692,585	KRUEGER, JON	
	Examiner	Art Unit	
	Stephen M. Baker	2112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final:
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>032405.053006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 14-22 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. A "program" lacking a tangible computer-readable medium is possibly recited.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 4, 13, 14, 16, 23 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,935,268 to Weaver (hereafter "Weaver").

Weaver discloses arrangements in a network device (202) such as routers (46, 50) or hubs (70) for encapsulating a packet to form a VLAN frame (column 2, lines 38+). When encapsulating the packet, a packet CRC (which is a form of "checksum") must also be modified, requiring a "method of determining a checksum of at least a portion of a packet." Weaver's CRC modification (checksum adjusting) requires "accessing a checksum of the at least the portion of the packet," then "adjusting the checksum of the at least the portion of the packet based on values of a subset of the at least the portion of the packet before and after modification of the subset," (column 7, lines 35+).

Regarding claim 13, Weaver's checksum adjusting is using program instructions (column 13, lines 8+).

Regarding claim 23, Weaver's network device (Fig. 11) presumably includes an interface for input and an interface for output.

Regarding claims 2, 14 and 24, Weaver's packet can be a TCP packet (column 1, lines 19-21).

Regarding claim 4 and 16, Weaver's checksum adjusting formula (Eqns. 1-3) involves "subtracting a checksum of the subset of the segment before the modification" and "adding a checksum of the subset of the segment after the modification.

5. Claims 1, 2, 23, 24 and 27 are rejected under 35 U.S.C. 102(a) as being anticipated by U.S. Patent No. 6,629,141 to Elzur *et al* (hereafter "Elzur").

Elzur discloses a LAN controller (52) including arrangements for modifying checksums in TCP packet headers (column 6, lines 53+), presumably by a checksum engine (120) in the LAN controller. Elzur's checksum modification presumably requires

"accessing a checksum of the at least the portion of the packet," then "adjusting the checksum of the at least the portion of the packet based on values of a subset of the at least the portion of the packet before and after modification of the subset."

Regarding claim 23, Elzur's LAN controller (52) includes interfaces for input (130) and output (90).

Regarding claim 27, Elzur's associated host computer provides a "processor." coupled to the PCI bus (72). Elzur's LAN controller (52) serves as a "network interface" to the host computer, and presumably includes "PHY" circuitry and a "framer," which are understood to be required for outputting LAN frames. The checksum engine (120) in Elzur's LAN controller (52) serves as a "Transmission Control Protocol (TCP) Off-load Engine (TOE).

6. Claims 1-4, 13-16, 23 and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,728,930 to Poeluev (hereafter "Poeluev").

Poeluev discloses a network enabler (16) for applying a method (100) to modify an internet packet header for the purpose of redirecting the packet to a different address (column 1, lines 51+). When modifying the header, a packet internet checksum must also be updated, requiring a "method of determining a checksum of at least a portion of a packet." Poeluev's checksum updating requires "accessing a checksum of the at least the portion of the packet," then "adjusting the checksum of the at least the portion of the packet based on values of a subset of the at least the portion of the packet before and after modification of the subset," in accordance with RFC 1071 (column 1, lines 61+ and column 4, lines 21-44).

Regarding claim 13, Poeluev's checksum updating is performed by a processor (14), presumably using program instructions.

Regarding claim 23, Poeluev's network enabler (16) presumably includes an interface for the network (18) coupling shown (Fig. 1) and an interface for the correspondent (e.g. pager, PDA, etc. 12) coupling shown.

Regarding claims 2, 14 and 24, Poeluev's internet packet can be a TCP packet (column 1, lines 19-21).

Regarding claims 3 and 15, Poeluev notes that the packet header or payload may be modified (column 4, lines 51+).

Regarding claim 4 and 16, Poeluev's checksum update formula $C' = C + (m' - m)$ involves "subtracting a checksum of the subset of the segment before the modification" (subtracting m) and "adding a checksum of the subset of the segment after the modification (adding m').

7. Claims 1-4, 8, 13-16, 23, 27 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 7,096,383 to Talaugon *et al* (hereafter "Talaugon").

Talaugon discloses a fault-tolerant router implemented with a plurality of virtual routing engines (VREs). Talaugon's VREs perform checksum adjustment (column 4, lines 36+). Talaugon's checksum adjustment requires "accessing a checksum of the at least the portion of the packet," then "adjusting the checksum of the at least the portion of the packet based on values of a subset of the at least the portion of the packet before and after modification of the subset."

Regarding claim 8, Talaugon's VREs each process a plurality of packet flows using a plurality of virtual router contexts (column 3, lines 9+), each VRE thereby providing "an engine of network processor having multiple engines," and each VRE operates by "executing program instructions."

Regarding claim 23, Talaugon's fault-tolerant router requires an input interface and an output interface.

Regarding claims 27 and 28, in Talaugon's outputting of Ethernet frames, a PHY circuit and a framer are presumably required.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,629,141 to Elzur *et al* (hereafter "Elzur").

Elzur does not disclose a specific type of LAN for the LAN controller (52), and thus doesn't specify an Ethernet LAN. Official Notice is taken that Ethernet is a well-known form of LAN. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use an Ethernet for Elzur's LAN. Such an application would have been obvious because Ethernet is a well-known form of LAN.

Art Unit: 2112

10. Claims 1-7, 13-18 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,269,374 to Chen *et al* (hereafter "Chen").

Chen discloses software-implemented arrangements for modifying a checksum of a data structure after each of a series of modifications of the data structure (column 6, lines 42+ and column 8, lines 40-50). Chen's checksum modification requires "accessing a checksum of the at least the portion of the packet," then "adjusting the checksum of the at least the portion of the packet based on values of a subset of the at least the portion of the packet before and after modification of the subset."

Although the checksums on modified data structures are taught by Chen to be usable for integrity verification upon data transmission (column 1, line 11), Chen does not specify transmitting the checksummed data using packets. Official Notice is taken that transmission of computer data by means of packets was conventional at the time the invention was made. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use packets to carry Chen's data structures to be transmitted. Such an application would have been obvious because transmission of data by means of packets was already conventional.

Regarding claims 2, 3, 14, 15, 24, Official Notice is taken that TCP packets were a conventional way of transmitting computer data at the time the invention was made. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use TCP packets to carry Chen's data structures to be transmitted. Such an application would have been obvious because transmission of data by means of TCP packets was already conventional.

Regarding claim 4 and 16, Chen's checksum adjusting procedure (Fig. 4) involves "subtracting a checksum of the subset of the segment before the modification" and "adding a checksum of the subset of the segment after the modification.

Regarding claims 6 and 18, Chen does not disclose details of caching operations used by Cheng's data modifying application. Official Notice is taken that caching data in order for an application to read and modify the data was conventional at the time the invention was made. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use caching necessarily involving the steps of "receiving a request to access (a) subset" of the data to be packetized from an application and "caching the subset" when the application is reading the data structure to be modified, and "receiving a request to write data to the cached subset" when the application is writing the modified data structure, after which the corresponding checksum adjustment "performing the adjusting" is made. Such a use of caching would have been obvious because caching data in order for an application to read and modify the data was already conventional.

Regarding claim 7, Chen does not describe the application responsible for modifying the data as being an application that first "parses" the data structure. Official Notice is taken that at the time the invention was made it was conventional for an application to parse a data structure before modifying the data structure. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use Chen's checksumming adjustment on data structures modified by an application that parses the data before modifying it. Such a use would have been

Art Unit: 2112

obvious because it was already conventional for an application to parse a data structure before modifying it.

11. Claims 9, 19 and 29, are rejected under 35 U.S.C. 103(a) as being unpatentable over Talaugon.

Regarding claim 9, although each software context running in a VRE may include the state and processes found in a conventional router, thereby implying each such context provides a "thread," Talaugon does not specify that each software context running in a VRE has an associated program counter. Official Notice is taken that providing each software context with a program counter was conventional at the time the invention was made. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to implement each of Talaugon's software contexts with an associated program counter. Such an implementation would have been obvious because providing each software context with a program counter was already conventional.

Regarding claims 19 and 29, Talaugon does not specify placing the multiple VRE processors on a single chip. Official Notice is taken that the advantages of placing multiple processors on a single chip were well known at the time the invention was made. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to implement each of Talaugon's VRE processors on a single chip. Such an implementation would have been obvious because the advantages of placing multiple processors on a single chip were already well known.

Claims 10, 12, 20, 22 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talaugon in view of U.S. Patent No. 7,266,120 to Cheng *et al* (hereafter "Cheng").

Cheng discloses other details of the same system as described by Talaugon.

Regarding claims 10, 20 and 30, a flow index is carried for each packet during Cheng's processing. Each flow ID corresponds to a cache entry that stores various protocol fields including L4 fields. Accordingly, Cheng apparently discloses "storing an identifier of the packet and a set of data associated with the identifier, the set of data including ... the checksum of the at least the portion of the packet." It would have been obvious to a person having ordinary skill in the art at the time the invention was made to implement Talaugon's processors using the flow ID processing disclosed by Cheng. Such an implementation would have been obvious because Cheng discloses other details of the same system as described by Talaugon.

Regarding claims 12 and 22, Cheng does not specify using a CAM to associate flow IDs with corresponding cache entries. Official Notice is taken that using a CAM to perform associative tasks was conventional at the time the invention was made. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to implement Cheng's flow ID associative processing using a CAM. Such an implementation would have been obvious because using a CAM to perform associative tasks was already conventional.

Claim Rejections - 35 USC § 112

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 10-12, 13-22, and 27-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In lines 1 of claims 14-22, "program of claim ..." apparently should be "program product on a medium of claim ...".

In claims 10, 11, 20, 21 and 30, the claims apparently do not agree with Fig. 4, wherein the "set of data" is presumably confined to the data set (256) and the "identifier of the packet" is presumably the buffer base address (240a).

In lines 1 of claims 29 and 30, "program" apparently should be "system" to agree with claim 27.

Claims 10, 11, 13-22, 27, 29 and 30 apparently should be amended as suggested below:

10. The method of claim 1, further comprising: storing an identifier of the packet and a pointer to a set of data associated with the identifier, the set of data including ~~data identifying~~ the checksum of the at least the portion of the packet.

11. The method of claim 10, wherein the set of data includes data identifying the location of a cached copy of the subset of the at least the portion of the packet.

13. A computer program product, disposed on a computer readable medium, to determine a checksum of at least a portion of a packet, ~~the program~~ the program including instructions for causing programmable circuitry to:
access a checksum of the at least the portion of the packet;

adjust the checksum of the at least the portion of the packet based on values of a subset of the at least the portion of the packet before and after modification of the subset.

14. The program product on a medium of claim 13, wherein the packet comprises a Transmission Control Protocol (TCP) segment.

15. The program product on a medium of claim 14, wherein the at least the portion of the packet comprises the TCP segment payload.

16. The program product on a medium of claim 14, wherein the instructions to cause the programmable circuitry to adjust the checksum comprise instructions to cause the programmable circuitry to: subtract the checksum of the subset of the segment before the modification; and add the checksum of the subset of the segment after the modification.

17. The program product on a medium of claim 14, further comprising instructions for causing the programmable circuitry to perform the adjusting of the checksum after each of a series of modifications of the segment payload.

18. The program product on a medium of claim 13, further comprising instructions for causing the programmable circuitry to: receive a request to access the subset of the at least the portion of the packet from an application; cache the subset; receive a request to write data to the cached subset; and perform the adjusting.

19. The program product on a medium of claim 13, wherein the instructions comprise instructions in an instruction set of an engine of network processor having multiple multi-threaded engines integrated on a single die.

20. The program product on a medium of claim 13, further comprising instructions for causing the programmable circuitry to: store an identifier to the packet and a pointer to a set of data associated with the identifier, the set of data including data-identifying the checksum of the at least the portion of the packet.

21. The program product on a medium of claim 20, wherein the set of data includes data identifying the location of a cached copy of the subset of the at least the portion of the packet.

22. The program product on a medium of claim 20, wherein the instructions to cause the programmable circuitry to store the identifier comprise instructions to cause the programmable circuitry to store the identifier in a content addressable memory (CAM).

Art Unit: 2112

27. A system, comprising:
at least one processor; and
at least one network interface operationally coupled to the processor, the network interface comprising:
at least one PHY layer circuit;
at least one framer; and
at least one Transmission Control Protocol (TCP) Offload Engine (TOE), the Offload Engine comprising circuitry to determine a checksum of at least a portion of a TCP segment, the circuitry to:
access a checksum of the at least the portion of the segment;
adjust the checksum of the at least the portion of the packet based on values of a subset of the at least the portion of the packet before and after modification of the subset.
29. The ~~program~~ system of claim 27, wherein the circuitry comprises an engine of network processor having multiple multi-threaded engines integrated on a single die.
30. The ~~program~~ system of claim 27, wherein the circuitry stores a reference to the packet and a set of data associated with the reference, the set of data including ~~data identifying~~ the checksum of the at least the portion of the packet, the set of data including data identifying the location of a cached copy of the subset of the at least the portion of the packet.

Conclusion


14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen M. Baker whose telephone number is (571) 272-3814. The examiner can normally be reached on Monday-Friday (11:00 AM - 7:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacques H. Louis-Jacques can be reached on (571) 272-6962. The fax

Art Unit: 2112

phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Stephen M. Baker
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Art Unit 2112

smb